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DEPLOYING AN OPERATIONAL ANTI-SATELLITE CAPABILITY: FILLING A VULNERABLE POINT IN U.S. DEFENSE

ADVANCED STUDIES ESSAY

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Introduction

In 1989, Secretary of Defense Carlucci asserted to Congress ".. that the lack of a U.S. ASAT [Anti-Satellite] system was the single most vulnerable point in the country's defense."[1] Since then, the Iron Curtain has fallen, Germany has reunified, the Soviet Union has disintegrated, Russia and Eastern European countries are delving into democratic and free market institutionalization, as is much of the rest of the world, and the United States stands as the remaining super power in the post-cold war world. Indeed, on the face of it, now would seem an odd time for the U.S. to add an operational ASAT capability to its military instrument of national power After all, the Communist threat has dramatically receded, the economic and political instruments of national power seem to have taken precedence over the military instrument, and, accordingly, the U.S military is undergoing reductions of historical proportions. But this is the time the U.S. should deploy an operational ASAT capability. What's more, that capability should be open to verification and known to the world. This paper expounds upon the reasons why deploying an operational ASAT capability would be a prudent step for the U.S at this time.

New Considerations

There are three factors to consider regarding the U.S ASAT question in today's world Foremost is the proliferation of space technology and services. Amidst the world's eruption of political and economic transitions, technology continues to advance and proliferate at an ever increasing pace As a result, space capabilities, including satellite imaging, are no longer solely the domain of the traditional space powers, most notably, the U.S. and Russia. Now, in addition to the U S and Russia, China, India, Israel, France, Spain, Italy, the European Space Agency, Japan, Canada, Brazil, and Germany have or are considering deploying imaging satellites [2] And an increasing number of these host nations are offering to sell imaging satellite services on a

commercial basis just as the French have done with their "Spot" satellites The fact that Spot Imaging Services has over 80 distributors in 60 countries provides an indication of the demand for and proliferation of such services [3] Many of the purposes for Spot imaging are of a civil nature, but Spot imaging clearly has military application as well Couple this with the second consideration, the growing trend of the U S and its allies to become involved in regional conflicts (as in the Gulf War of 1991, and Bosnia now), and it becomes evident that the possibility of an adversary force gaining access to satellite imaging capabilities to the detriment of U S. and allied forces is a rapidly expanding threat which the U.S. cannot afford to ignore The third consideration is the recession of cold war tensions which were at the root of many of the old arguments against a U.S. operational ASAT.

Old Arguments Addressed

During the cold war, ASAT opponents postulated that the U.S deployment of an operational ASAT would trigger a reciprocal series of U S.-Soviet ASAT developments and deployments that would constitute a new dimension to the arms race. This argument held some credibility since any U.S ASAT was obviously meant to counter Soviet military satellites, particularly those that provided intelligence gathering capabilities against U.S. and allied forces [4] Now, with the end of the cold war and the proliferation of imaging satellites and services, this argument has lost what substance it might have had This is not to say that the U.S., in acquiring and deploying an ASAT capability, should disregard Russia; indeed, the U.S should be open to Russia about the ASAT capability the U.S intends to deploy. Despite the possibility of lingering apprehensions on Russia's part, Russia must concede that space imaging proliferation is a reality that poses a threat, and that Russia and the U S. may well be allies in future regional disputes -- as in Bosnia now -- and thus, will likely face the same imaging satellite threat

Another cold war argument against a U.S. ASAT was that the U S deployment of such a capability would significantly increase the possibility of an exchange of ASAT attacks with the Soviet Union in which the U.S. stood more to lose since it depended on its space assets more than the Soviets did on theirs. The fallacy of this argument is the implication that if the U S refrained from deploying an ASAT capability, U S. satellites would be less likely to come under enemy ASAT attacks despite the fact that the Soviets had -- and Russia still has -- ASAT capabilities in the form of their operationally deployed (since the early 1970s) Co-orbital ASAT system and other systems with potential ASAT capabilities such as ABM missiles and high-energy ground-based lasers If an adversary has an ASAT capability and the U S does not, the U.S. will simply be in the undesirable position of having to defend its satellites while the adversary's satellites go unchallenged. As always, what really raises the probability of ASAT attacks against U.S. satellites is not the U S. possession of an ASAT capability, it is that U.S. satellites provide tremendous warfighting enhancements to U.S. and allied surface and air forces Any adversary would like to negate these warfighting enhancements. And this is exactly the reason the U.S. needs an ASAT capability today -- because potential adversaries have or can get access to space capabilities that threaten to enhance their military effectiveness against the U S and its allies Therefore, the U S should take steps to add an ASAT capability *and* to defend its satellites from enemy ASAT attacks; both are necessary for a complete and viable space capability To reiterate, the U.S. deployment of an ASAT capability does <u>not</u> increase the need for satellite defense since satellite defense is already necessary by virtue of satellite capabilities Indeed, an ASAT capability and satellite defense are exactly the two essential elements that comprise modern "space control" doctrine which stipulates that achieving a war-winning posture requires preservation of one's own operations in space -- via satellite defense -- while denying the enemy the ability to operate in

space -- via an ASAT capability This doctrinal concept is precisely parallel to sea and air control which are historically well grounded as requisites for war winning. There is no reason that space can or should be treated differently.

A third argument against ASATs finds its philosophical basis in idealism -- that war should not be allowed to extend into space While this argument has some intuitive appeal in that it provides a vestige of the human domain left free of war, closer consideration reveals the argument is hollow *Meaningful* peace occurs among people, not in the absence of people. To cling to space -- a dark, cold, and vacuous place completely hostile to human life -- as a last sanctuary of peace seems peculiar, particularly when systems in space provide warfighting enhancements. Peace in space would have value if it meant peace on Earth, but it does not Nor will peace in space have any redeeming value while wars rage on the Earth's surface. Indeed, the best way to ensure peace in space is to continue the endeavor for the vastly more meaningful peace on Earth And part of that endeavor is the elimination of any vulnerability -- in this case, the U S lack of an ASAT capability -- which invites non-peaceful exploitation Accordingly, a U.S. ASAT capability would contribute to achieving peace on the Earth's surface which, in turn, would better ensure peace in space. Toward that end, the Gulf War may have helped dispel the argument of no war in space. Since the contributions of space systems to the coalition victory were significant and well publicized, the idea that enemy systems might be left untouched while providing similar valuable services to an adversary should be very unappealing to most Americans

What Sort of ASAT?

There are three fundamental ways to render a satellite dysfunctional. 1) temporarily jam satellite functions, 2) destroy the ground facilities which control and collect information from satellites and 3) permanently damage or destroy selected satellites. The first of these -- jamming -

- is attractive since it does not inflict permanent damage on the satellite and is, therefore, more politically palatable, particularly if the satellite in question belongs to a third party, not the adversary Depending on the type of satellite, jamming can take the form of electromagnetic transmissions which interfere with the satellite's transmissions or radar collections, or might be something like low-level laser emissions to saturate visible-spectrum or infrared sensors But jamming has significant drawbacks. Since jamming is temporary and requires line-of-sight with the target satellite, it must be done from the right place, at the right time, and with the right frequencies to be effective. Thus, getting the proper equipment into a theater of operations to perform satellite jamming at the needed times can be quite problematic. Also, jamming may be rendered ineffective by a variety of anti-jamming techniques that are common to electronic combat. To compound this problem, verifying the effectiveness of jamming is difficult if not impossible, and leaves U.S. and allied forces unsure of whether the adversary has been able to observe key military activities such as major maneuvers or concentrations.

The second ASAT option -- destroying satellite ground control facilities -- is also fraught with significant problems. The most obvious is that it involves an attack on sovereign soil. That may be acceptable if the owner/operator of the satellites is the adversary and the facility is located within the adversary's country But more than likely, given the proliferation of satellite imaging services offered on a commercial basis, the owner/operator will be a third party and the facility will be located in a country other than the adversary's Under these circumstances, attacking and destroying a satellite ground facility along with the people manning it -- an act of war -- would be an entirely untenable option Also, satellites usually operate in constellations of two or more, and ground facilities often control several types of satellites with different functions including imaging, weather, and communications. Therefore, destruction of a ground facility may render entire

satellite constellations and functions useless even though many of them do not pose a direct threat and probably contribute significantly to the country's economic and military viability. Again, if the facility in question belongs to the adversary, this may not be an issue, but it makes attacking a third party's facility even less acceptable. Nonetheless, the option of destroying satellite control ground facilities is generally available since it can be achieved with the wide variety of ground attack means already deployed But for the reasons given above, destroying ground facilities cannot be considered an adequate ASAT capability

The last option -- damaging or destroying satellites -- can be accomplished with direct impact ("kinetic kill") projectiles or directed energy weapons such as high-powered lasers. This is the most appropriate method to pursue for an operationally deployed ASAT capability Attacking a satellite is still an attack against foreign property, but it is far less controversial than destroying a ground facility and people on sovereign soil It is also arguable that an attack against a satellite -- even a third party satellite -- which is threatening to expose critical military activities in a theater of operations can be justified on the basis of self defense, an "inherent right" recognized in Article 51 of the UN charter. This ASAT option is also highly selective in that it provides the capability to eliminate specific satellites based on the situation at hand And once a satellite is attacked, existing ground-based space surveillance systems can verify the success of the attack so that U.S. and allied forces can be sure of the adversary's ability, or lack of ability, to observe key military operations. Another advantage of this ASAT approach is that it does not have to be deployed outside the U.S. since satellite orbits are relatively predictable and satellites can be intercepted over the U.S. before reaching the theater of operations in another part of the world. Finally, unlike the first two options, ASATs of this sort are verifiable and should be open to verification

In fact, this type of ASAT capability should be thoroughly verified and well publicized for three reasons. First, verification will assure any officially recognized party that the system does not have an Anti-Ballistic Missile (ABM) capability and, therefore, is not in violation of the 1972 ABM Treaty. Second, officially recognized parties would also verify that the ASAT has an intercept capability up to but no higher than about 1,000 miles All imaging satellites operate below 1,000 miles in so-called "low-earth-orbits", hence, all would be within the range of the U.S. ASAT But the 1,000 mile limitation would clearly rule out the capability to attack satellites that provide national authorities with Command, Control, and Communications (C3) and early warning of missile attack since these satellites typically operate at much higher altitudes, up to 22,500 miles ("geosynchronous orbits") and beyond This is important because the ability to threaten C3 and early warning satellites would be potentially destabilizing since a malfunction of these type satellites might leave national authorities wondering if the satellite had really malfunctioned or was the victim of an ASAT attack as a precursor to a nuclear strike; something that, despite decreased probability, cannot be discounted as long as strategic nuclear weapons remain operational. Thus, while deploying an ASAT system capable of attacking satellites in low-earth orbits is appropriate, at the same time, the U S and Russia, along with emerging space powers (e.g., China and India), would do well to formally ban the development and deployment of higher altitude capable ASATs. The third and equally important reason verification is necessary is so that countries and commercial entities with satellite imaging capabilities will know that the U.S has the capacity to eliminate their imaging satellites should they be used against U.S. and allied military operations

Therein lies the most plausible deterrent affect of a U.S. ASAT capability; not to deter the use of enemy ASATs against U.S. satellites (the "response-in-kind" concept which is an iffy

proposition that is too situationally dependent to be counted upon), but to deter imaging satellites from being used against U.S. and allied forces. Simply put, a commercial supplier, in determining whether to provide imaging satellite services to an adversary, risks losing one or more satellites to U.S ASAT attacks. The cost/benefit analysis is straightforward: money lost due to the loss of one or more satellites, versus keeping the satellites and gaining the profits from other tasks not counter to U.S. and allied interests Certainly there are other means of leverage -- diplomatic and economic -- which the U.S might use to dissuade a country or commercial entity from using its satellites in ways detrimental to the U.S. and its allies, and the U.S. should use these whenever possible But these other means can often take more time than a situation in a theater of operations will allow and they don't guarantee the right answer. An ASAT capability would provide rapid leverage with a final option -- its actual use -- that would ensure security from imaging satellites In fact, the known availability of this final option would bolster the potential for timely diplomatic or economic resolution of imaging satellite issues with parties that might not otherwise be so inclined. Thus, a U.S. ASAT system, like other deterrent systems (such as strategic nuclear weapons), could prove highly valuable without ever having to resort to its actual use.

Conclusion

The bottom line is that the current U S. inability to selectively attack and destroy satellites in low-earth-orbits is an open invitation for adversaries to employ increasingly available satellite imaging services against U.S. and allied interests To rectify this, the U S needs an operational ASAT capability -- now would not be too soon With this in mind, the specific types of systems that would fulfill the U.S. requirement for an ASAT capability in the near term are the Army's direct-ascent kinetic kill vehicle or a ground-based laser, perhaps derived from the Mid-Infrared

Advanced Chemical Laser research project in White Sands, New Mexico.[5] In the past few years, Congress has provided low-level funding to keep both as technology efforts. And recently, Congress has shown increased support for U.S. ASAT efforts by including $30 million in the 1996 DoD appropriation bill (up from $5 million in 1995) for the Army's kinetic kill ASAT vehicle development.[6] This is encouraging, but still a long way from opening the door for complete development, testing, acquisition, and deployment of an operational ASAT, and that is what needs to happen Doing so would provide a counter to the proliferating threat of satellite imaging, would go far to fulfill proven doctrine, and thus would eliminate that "most vulnerable point" that Secretary Carlucci identified back in 1989.

[1] Marcia S Smith, "ASATs -- Antisatellite Weapon Systems " (Washington GPO, 1989) 8

[2] Marcia S Smith, "DoD Antisatellite Effort Gets a Boost " Space News, 16-22 Oct 1995 20

[3] Andrew Wilson, ed , Jane's Space Directory, 1995 - 96 (Surrey, UK International Thomson Publishing Company, 1995) 412

[4] Soviet Photographic Intelligence (PHOTINT) and Electronic Intelligence (ELINT) satellites located and gathered information about land forces while Soviet Radar Ocean Reconnaissance Satellites (RORSATs) and Electronic Ocean Reconnaissance Satellites (EORSATs) located and gathered information about naval forces

[5] Jeffrey M Lenorovitz, "Satellite Kill Vehicle Validated in Test Firing " Aviation Week and Space Technology, 26 Sep 1994 23

[6] Smith, DoD Antisatelite Effort 20